CLAIMS

WHAT IS CLAIMED IS:

7. A means for the design and implementation of encoders and decoders for Hybrid Walsh complex orthogonal CDMA channelization codes over a frequency band with properties

inphase (real) codes are equal to a lexicographic reordering permutation of the Walsh code

quadrature (imaginary) codes are equal to a lexicographic reordering permutation of the Walsh code

codes have a 1-to-1 sequency~frequency correspondence with the DFT codes

codes have 1-to-1 even~cosine and odd~sine correspondences with the DFT codes

codes take values {1+j, -1+j, -1-j, 1-j}

codes take values {1, j, -1, -j} with a (-45) rotation of axes and a renormalization

codes have fast encoding and fast decoding algorithms

encoders are implemented in CDMA transmitters for representative embodiments as complex multiply channelization

encoding of the inphase and quadrature data replacing the Walsh real multiply channelization encoding of the inphase and quadrature data, prior to covering by long and short complex PN codes

decoders are implemented in CDMA receivers for representative embodiments as complex conjugate transpose multiply decoding of the inphase and quadrature encoded data replacing the Walsh real multiply decoding of the inphase and quadrature encoded data, after decovering by short and long complex PN codes

8. A means for the design and implementation of encoders and decoders for generalized Hybrid Walsh complex orthogonal CDMA channelization codes over a frequency band with properties

codes can be constructed for a wide range of code lengths by combining with DFT and quasi-orthogonal PN codes using tensor product, direct product, and functional combining

codes can be constructed as tensor products with DFT codes and quasi-orthogonal PN codes and other codes

codes can be constructed as direct products with DFT codes and quasi-orthogonal PN codes and other codes and with functional combining

codes are complex valued

codes have fast encoding and fast decoding algorithms

encoders are implemented in CDMA transmitters for representative embodiments as complex multiply channelization encoding of the inphase and quadrature data replacing the Walsh

real multiply channelization encoding of the inphase and quadrature data, prior to covering by long and short complex PN codes

decoders are implemented in CDMA receivers for representative embodiments as complex conjugate transpose multiply decoding of the inphase and quadrature encoded data replacing the Walsh real multiply decoding of the inphase and quadrature encoded data, after decovering by short and long complex PN codes

9. A means for the design and implementation of encoders and decoders for complex orthogonal CDMA channelization codes over a frequency band with properties

inphase (real) codes are equal to a reordering permutation of the Walsh code

quadrature (imaginary) codes are equal to a reordering permutation of the Walsh code

codes are complex valued

codes have fast encoding and fast decoding algorithms

encoders are implemented in CDMA transmitters for representative embodiments as complex multiply channelization encoding of the inphase and quadrature data replacing the Walsh real multiply channelization encoding of the inphase and quadrature data, prior to covering by long and short complex PN codes

decoders are implemented in CDMA receivers for representative embodiments as complex conjugate multiply decoding

of the inphase and quadrature encoded data replacing the Walsh real multiply decoding of the inphase and quadrature encoded data, after decovering by short and long complex PN codes

10. A means for the design and implementation of encoders and decoders for generalized complex orthogonal CDMA channelization codes over a frequency band with properties

codes can be constructed for a wide range of code lengths by combining with DFT and quasi-orthogonal PN codes using tensor product, direct product, and functional combining

codes can be constructed as tensor products with DFT codes and quasi-orthogonal PN codes and other codes

codes can be constructed as direct products with DFT codes and quasi-orthogonal PN codes and other codes and with functional combining

codes are complex valued

codes have fast encoding and fast decoding algorithms

encoders are implemented in CDMA transmitters for representative embodiments as complex multiply channelization encoding of the inphase and quadrature data replacing the Walsh real multiply channelization encoding of the inphase and quadrature data, prior to covering by long and short complex PN codes

decoders are implemented in CDMA receivers for representative embodiments as complex conjugate transpose multiply decoding of the inphase and quadrature encoded data replacing the Walsh real multiply decoding of the inphase and quadrature

encoded data, after decovering by short and long complex PN codes

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